

ON SOME MESOZOIC FOSSILS FROM CENTRAL AUSTRALIA.

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WITH TWO PLATES.

The fossils described and figured in this paper were obtained by Mr. Gilliatt, one of the surveyors in the Mining Department. They were found in sinking a well on Mount Stewart Run, which is situated on the Grey Ranges. The fossiliferous bed was struck at a depth of 90 feet. The remains comprise many specimens of *Avicula*, some *Gryphea*, a *Trigonia*. *Belemnite*, *Pecten*, *Ostrea*, *Pinna*, *Cyprina*, *Mytilus*, and many broken fragments. The only species which can be determined, are of *Avicula*, *Pecten*, *Trigonia* and *Belemnites*, the rest being too imperfect.

The sand is of a greyish green color, with numerous blackish grains. In places it is finely levigated, so as to preserve impressions of the faintest markings on the shells. Some portions are a coarse grey green sand, easily powdered. Under the microscope, this sand is seen to be composed of angular fragments of crystals, with small portions of shelly matter. There were very few rounded grains and none polished. When treated with hydrochloric acid, there was only a slight effervescence, confined I suppose to the fragments of shelly matter. I could not detect any Foraminifera. Some of the fragments of crystals were dark black or green, some opaque white, and some transparent. There were also a few brown opaque grains. The transparent grains seen in polarized light, all showed bands of color and some twin crystals and triclinic felspar. The large green crystals were dark and opaque; some of the smaller dark grains had almost a metallic lustre. From the absence of any glassy particles, as well as there being so little marks of ferric oxides, we may conclude that this sand was derived from the weathering of some of the ancient granite rocks, and not from volcanic or trap rocks. There is a general external resemblance in the rock to the greensands of Britain and France, but the resemblance is merely external. There is no trace of the glauconitic

materials, to which the color of so many of the European green sands is due. It is owing in that case, to a peculiar green deposit in the chambers and cells of Foraminifera, while in the Australian rocks, there are no Foraminifera and very little lime. The green color is due to small fragments of a material which I believe to be opaque hornblende. There is some admixture of iron pyrites, and a good deal of brown coal and fragments of coniferous wood mixed with fossil remains, but there are no notes to show whether they occurred in distinct bands or were indiscriminately mingled with the rest.

The fossils contained in this collection, comprise: One fine specimen of the guard of a *Belemnite*, which I regard as identical with *Belemnites australis*. Moore.* Some valves too imperfect for satisfactory identification, but not unlike *Cucullaea inflata*. Moore (loc. cit. p. 250). Also fragments of a large *Cyprina*. (*C. expansa* Etheridge? Jour. Geol. Soc. 1872, p. 338), a *Mya*, *Tellina*, and finally numerous large and well-preserved specimens of *Avicula* with characters which belong to many of the species described by Moore, besides a single valve of a species of *Trigonia* which is certainly undescribed. I shall proceed to consider these fossils in detail.

Belemnites australis, Moore (loc. cit. Plate XVI. figs. 1, 2, 3, 4, 5.) Guard hastate, with a rather long, very slightly undulating outline, ventral face flattened but without a trace of a ventral groove; two lateral grooves sharply cut and approximating to the ventral face in the alveolar region, thence bending towards the dorsal aspect with a scarcely perceptible curve and continued in a fine stria on the ventral margin. The specimen is broken round the alveolar cavity, but the extreme length of what remains is 145 millim. width at the alveolar end 20, greatest width at the end of the lateral groove, and about the centre of the fossil 22, ventro-dorsal width greatest at the broken end, and gradually tapering thence to the point.

* Quart. Jour. Geol. Soc. Lon. 1870, p. 261.

In the foregoing diagnosis it will be seen that our specimen differs from *B. australis* in its greater length, in tapering to a point, and the slightly different curvature of the lateral groove. It resembles it in all other particulars, especially in the depression by lateral expansion of the post alveolar region, in the lateral grooves being so sharply cut in the alveolar and post-alveolar region and in the absence of the ventral groove.

I do not therefore think it advisable to erect it into a new species, but should it prove new I propose for it the name of *B. oxyis*. (Pl. XIII., figs. 1, 2 and 3.)

This species belongs evidently to the division *Hastati* of M. d'Orbigny as Mr. Moore has pointed out in the case of the specimen from Wollumbilla. In this group the guard is elongated and provided with lateral grooves for a portion of the length, but always with a long ventral groove, which is wanting in the Australian species. The typical species of the group is *B. hastatus*, Blainville, which is found in all the middle Oolitic beds from the Kellaways rock to Upper Oxfordian. Other members of the same group have been found in the Oolites of France, England, Russia, and the province of Cutch in India. Other forms of the *Hastati* are found in the Lower Cretaceous, so that the group is considered to belong to the middle and upper mesozoic rocks.

NEW SPECIES.

Trigonia mesembriu, sp. nov. Pl. XII., figs. 1, 2 and 3. *T. t. oblongo-ovali*, postice producta, tumida, crassa, umbonibus paullum anterioribus, prominulis, haud curvatis; margine superiore concavo, elongato, margine posteriore curvato, sed postice truncato; Antice tumide producta, rotundata; sulco posteriore lato, conspicuo, minime profundo, marginibus valde divergentibus a natibus ad marginem; costis transversalibus, haud prominulis, costulis aliquando intercalantibus antice parum undulosis sulco posteriore evanescentibus; carina levi, sulcis tribus latiusculis munita, lunula longa levi ovata, 2 sulcis longis latis, sculpta, basin versus striata; dentibus cardinalibus crassis conspicuis marginibus superioribus bi-sulcatis, sulcis lateralibus 13, crebris, concinnis.

Shell ovately oblong, produced posteriorly, thick, tumid, very convex, umbones somewhat anterior, not recurved, superior border moderately concave, rather elongate, posterior border curved, slightly truncate at the siphonal margin ; anterior border tumidly produced and rounded, posterior groove wide, conspicuous, shallow, widening rapidly from the umbones to the margin, costa irregular, not prominent, some smaller ones occasionally intercalated, all passing horizontally across the valve, slightly undulating anteriorly, disappearing on the posterior groove ; siphonal ridge smooth, with three narrow rounded ridges, three rather wide, shallow, grooves between, which become faint as they widen out towards the margin, escutcheon long, ovate, with a flat groove on each side, striæ on the lower part, the rest smooth, margins raised ; hinge teeth thick, large, prominent, with two grooves on the upper edge and about 13 close, neat, parallel, lateral grooves. The shell is of considerable thickness and is separated into two layers the outer of which is the thicker.

This fossil manifestly belongs to that section of the large genus *Trigonia*, which is classed as *Glabræ* or smooth. The section is characterised by sub-quadrangular or elongately ovate shells moderately compressed, area not margined or indicated by a distinct groove, sides ornamented with smooth concentric ribs, sometimes extending over the area, or becoming quite obsolete before reaching it. The type is *T. longa*, Agassiz.

The group of *Glabræ* is decidedly Cretaceous, most of the species belong to that period, though one or two species rarely extend into the Jura.

The above fossil comes nearest in its form to *T. excentrica*, Park, and *T. duncombensis*, Lycett, both Greensand species or Lower Cretaceous in Britain. There is a single elongated species of the *Glabræ* division, from the Cretaceous rocks of America. It comes from Columbia. *Trigonia semiculata*, Stol., of the Cretaceous rocks of Pondicherry, is a short globose species, with the transverse costa interrupted about the middle of the shell by the usual smooth anti-carinal space, but it is not grooved as in the present species, is short, has not the posterior carina, and has the costa much more regular.

It may be as well here to review all the described Australian mesozoic species of *Trigonia*. They are *T. costata*, Clarke, which is the same as *T. morei*, Lycett, *T. lineata*, Moore, *T. nasuta*, Etheridge.

The name *T. costata*, was applied by the Rev. W. B. Clarke, F.R.S., to a species from Western Australia (Greenough River), under the belief that it was *Trigonia costata* of Parkinson.* In Moore's paper already referred to, the differences between the species are pointed out by the late Mr. Lycett, and the Australian one, named *T. morei*. It is one of the group called *Costatæ*, and therefore entirely different from the new fossil described here.

Trigonia lineata, Moore (loc. cit. p. 255) was described from two imperfect specimens, one a cast showing the teeth, and the other much abraded. It is a gibbous form, as broad as long, and therefore quite distinct from our species. Professor McCoy placed it with the Permian and Rhætic genus *Myophoria*, but Mr. Moore considered that the absence of the oblique keel and the acute posterior side, precluded such a reference

Trigonia nasuta, Etheridge (Jour. Geol. Soc. Lond. 1872, p. 339, pl. xix., figs. 2, 2a). This fossil was described from a cast only, but which Mr. Etheridge says, belongs to a type unknown in Jurassic rocks. It is much higher and deeper than our fossil, and was referred to the group *Scabræ* nearest to *T. sanctæ crucis*, Pietet and Camp., but a discovery of the external surface, might show it to be much nearer to the present species.

Pecten psila, sp. nov. *P. t. parva, trigonali-orbiculari, æquivalva, valde depressa, vix convexiuscula, omnino levi, vel marginem versus tenuissime concentricè striata, auribus inæqualibus, radiatim costatis, antice elongata triangulata producta, posteriore flabelliformi.*

Shell small, suborbicular, equivalve, depressed, hardly convex, entirely smooth, and without ornament of any kind, except one or two very faint lines of growth near the exterior margin; ears

* Organic Remains. vol. 3, pl. 12, fig. 4; Paleontograph Soc. Monograph, Lycett and Moore, Mollusca of the Great Oolite, pl. 5, fig. 23; Lycett. Brit. Foss. Trigonia, vol. 33, p. 227, a wood cut of *T. Moorei*.

unequal, radiately ribbed, the anterior one in the form of an elongated triangle, produced along the dorsal margin for half the length of the shell, posterior smaller, fan-shaped.

This small, smooth, depressed *Perten*, belongs to a type which is common in the mesozoic rocks, the middle mesozoic especially. In a genus so abundantly represented in species during almost every geological period resemblances can be found on every side. But it is particularly like *P. socialis*, Moore, which is a sub-orbicular shell moderately convex, umbones convex and pointed, auricles unequal, anterior one much the largest. Mr. Moore says that the external ornamentation of the shell is not well preserved, but it appears to have been nearly smooth, without visible concentric striæ but with depressed radiating ribs. In general form it is not unlike *P. rigidus*.* It is one of the most abundant shells in the boulders from Wollumbilla, many specimens of various ages appearing on their fractured surfaces.

The fossil I have described might well be a young state of Mr. Moore's fossil. It is much smaller, the average dimension from hinge to margin is about 6 millimeters with a transverse diameter of 5. It is found abundantly scattered over some fragments of dark, olive greenish marl, looking not unlike *Nummulites*. As I have only seen the figures and descriptions of *P. socialis*, and as the details are very imperfect, I think it better not to make too hasty an identification but point out the resemblance for future enquiry.

Avicula barklyi, Moore, *vel reflecta*, Moore var. *gilliatti*, pl. XII., figs. 4, 5 and 6. The great mass of the fossils in this collection is a large species of *Avicula* of which a figure is given. It possesses all the characters of both the fossils above-named in different specimens and I think that the specific distinctions between the two will be found on examination to disappear. Any one who examines the series figured by Mr. Moore from Wollumbilla including eight species, will be inclined to refer them all to one, differing from each other merely in size and mode of growth. The posterior wing auricle is lengthened and undulating in the large and old specimens

* A fossil species of the Great Oolite, Wiltshire. See Sowerby's Mineral Conchology, plate 205, fig. 8.

(those of about 90 millimeters long), and the produced posterior wing makes the transverse and longitudinal diameters quite equal. *A. barklyi*, has been recognized by Prof. Tate, from Cape Creek, and other fossils described by Moore as associated with that fossil from Primrose Springs and Lake Eyre, in Central Australia. (See Trans. Roy. Soc. S. Australia, Vol. VI., p. 144.) They were scattered on the surface much in the way the fossils are at Wollumbilla.

SUMMARY.

From the occurrence of some cretaceous forms in this deposit, I am inclined to think that it belongs to the so-called great Cretaceous formations of Central Australia, and North-eastern Australia. There is certainly also a mixture of jurassic types, but their evidence is not so marked, and I am inclined to think that there has been a mixture of fossils from different localities in Mr. Moore's collection. There are true Oolitic beds near the Peak Downs, and amongst these I have recognized some of Moore's species, but never the *Aviculæ*, and *Belemnite* here referred to. It is possible, however, that our Australian Cretaceous rocks may be very low in the series, and contain moreover as in the Australian strata a fusion of those well-marked specific boundaries which paleontologists are accustomed to elsewhere. In any case I am rather disposed to regard the Central Australian beds about Lake Eyre, the Peake and Primrose Springs as cretaceous. I propose to examine the Wollumbilla beds, carefully at my earliest leisure and then will try for its position more certainly.

EXPLANATION OF PLATES,

Plate XII.

- Fig. 1.—*Trigonia mesembria*, inner surface of valve.
 „ 2.—Upper surface showing concentric costa.
 „ 3.—Anterior end with tooth.
 „ 4.—*Avicula barklyi*, upper valve.
 „ 5.—Ditto ditto, lower valve of same specimen.
 „ 6.—Another upper valve with better defined ribs.

All figures reduced one-half nat. size.

Plate XIII.

Fig. 1.—*Belemnites australis*, Phillips? or *B. oxyis*, nobis. ventral aspect.

„ 2.—Ditto lateral aspect showing the slight curve of the lateral groove.

„ 3.—End view with alveolar cavity, lying on ventral surface.

All figures two-thirds natural size.

A SECOND HALF-CENTURY OF PLANTS NEW TO SOUTH QUEENSLAND.

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DILLENIACEÆ.

Hibbertia fasciculata, R. Br. in Dc. Syst. Veg. i, 428

On moist ground near Burleigh Head It departs from the typical species in the smaller size of its flowers. Having a wide geographical range, variations must occur, caused by its adaptability to different climates and various soils.

PITTOSPORÆ.

Pittosporum phillyræoides, Dc. Prod. i., 347.

It is somewhat strange to find this plant on the eastern side of the dividing range. It looks like a straggler from its home. Although ubiquitous through the Australian continent on the western slopes and desert regions, the height of the Australian divide limits its geographical distribution towards the east. A few solitary trees of this *Pittosporum* may be seen growing on knolls of loose stones, which here and there give rise to tufts of vegetation close by the Dugundan jungle along the Teviot Brook.

BIXINEÆ.

Scolopia Brownii, F. v. M., Frag. iii., 11.

The flowers of the collected specimens being imperfect, afford no conclusive proof of the identity of this species; still there is left enough available to form a very probable opinion. There was no